



Sustainability Reporting Practice in Technology Companies in ASEAN: a Systematic Literature Review

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Abstract

This study conducts a comprehensive Systematic Literature Review (SLR) to examine sustainability reporting (SR) practices among technology companies in the ASEAN region. Guided by the PRISMA 2020 protocol, the review synthesizes results from 11 peer-reviewed journal articles published between 2015 and 2025. The research aims to map SR practices, analyze links between SR, governance, innovation, and performance, and identify new challenges and research gaps in sustainability reporting. The findings show that SR implementation in ASEAN remains fragmented and mostly voluntary. Disclosure quality varies across countries. Governance factors such as board independence, gender diversity, and sustainability commitment enhance the credibility and clarity of SR. Strong institutional frameworks in Malaysia and Singapore foster more robust adoption. Digital transformation and sustainability-driven innovation help boost reporting efficiency and transparency for stakeholders. However, institutional and technological barriers limit broader adoption. Compared to Europe and China, ASEAN lacks regulatory harmony, data standards, and digital readiness. This study adds value by consolidating theories, such as Stakeholder Theory, Legitimacy Theory, and the Resource-Based View. It explains how governance and innovation shape the development of SR in emerging digital economies. The review concludes by calling for standardization across ASEAN countries, capacity-building efforts, and more longitudinal empirical studies. These steps can strengthen SR's strategic impact on sustainability and accountability in ASEAN's technology sector.

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Introduction

Sustainability reporting (SR) has evolved from a voluntary disclosure tool into an institutionalized framework for corporate transparency and accountability. It integrates environmental, social, and governance (ESG) principles into corporate strategy. This aligns business objectives with sustainable development (P. Goel & Misra, 2020). Globally, the movement toward sustainability disclosure is fueled by regulatory advances, such as the European Union's Corporate Sustainability Reporting Directive (CSRD) and the International Sustainability Standards Board (ISSB). These establish cross-border comparability and mandatory ESG disclosure (Lee et al., 2025; Pratama et al., 2022). Such initiatives reflect the growing view that sustainable business performance depends on more than profitability alone. Ethical governance, innovation, and social legitimacy are also essential. Global regulations are putting significant pressure on ASEAN technology companies to adapt quickly, even though their current regulatory landscape remains dominated by voluntary initiatives.

Within ASEAN, technology firms have a key role in the region's digital and environmental change (Chairina & Tjahjadi, 2023; Khunkaew et al., 2023). Rapid digitalization, innovation ecosystems, and data-intensive operations make this sector both a driver and subject of sustainability concerns (Harsanto & Permana, 2019). However, fragmented sustainability reporting practices result from different governance structures, voluntary regimes, and weak institutional enforcement. This creates barriers to comparability and consistency (Abbas et al., 2022; Hamad et al., 2020). Such fragmentation raises the risk of greenwashing and distorts ESG-related capital allocation, especially when investors rely on inconsistent data to evaluate firms' environmental and social performance. The sector's innovation potential is limited by the lack of harmonized SR standards and poor digital integration in reporting mechanisms (Paridhi & Ritika, 2024; Sambodo et al., 2022).

While previous empirical studies by Chairina and Tjahjadi (2023); Jouha (2015); Khunkaew et al. (2023) have established that governance quality enhances SR credibility and that innovation fosters transparency and eco-efficiency Qureshi et al. (2020), the literature remains fragmented in theoretical orientation. One stream focuses on corporate governance under Agency Theory, emphasizing managerial alignment and accountability, while another explores Innovation and Digital Transformation using frameworks such as Actor Network Theory (ANT). However, few studies have captured the dynamic interplay among governance, digital transformation, and the institutional complexity unique to ASEAN economies. Consequently, the existing body of knowledge lacks a comprehensive synthesis that connects governance-driven accountability with digital-enabled sustainability mechanisms.

While studies Khunkaew et al. (2023) have demonstrated the GCG SR link, these studies are generally cross-sectional and fail to simultaneously capture the dynamic interplay between GCG, digital transformation, and complex institutional theory in ASEAN. The gap, therefore, lies not in whether governance or innovation matters, but in how they interact within evolving digital and institutional ecosystems to shape SR adoption and performance.

This study has three objectives. First, to map the current knowledge of sustainability reporting among technology companies in ASEAN. Second, to analyze the theories connecting SR with governance, innovation, and firm performance. Third, to identify challenges and future research directions to advance sustainable reporting in the region.

This study follows the PRISMA 2020 protocol on a limited sample. It provides the most rigorous and up-to-date thematic classification of SR drivers in this rapidly changing sector. Through this synthesis, the study bridges theoretical gaps. It shows how governance and digital innovation unite to strengthen corporate sustainability accountability in ASEAN's technology sector.

Literature Review

Corporate Governance and Sustainability Reporting Quality

Corporate governance has long been recognized as a cornerstone of accountability and transparency in corporate reporting, directly shaping the quality and credibility of sustainability reporting (SR) (Hamad et al., 2020; Jouha, 2015). Within ASEAN, evidence consistently links board independence, gender diversity, and the presence of sustainability committees with higher SR quality, stronger readability, and more credible disclosures (Chairina & Tjahjadi, 2023; Khunkaew et al., 2023). From a Stakeholder Theory perspective, governance structures are expected to balance multi-stakeholder demands, pushing firms toward broader and more substantive disclosures that signal responsibility beyond minimum requirements (Freeman, 1984). However, Agency Theory frames SR as a mechanism to reduce information asymmetry and managerial opportunism, implying a disclosure logic that can remain closer to compliance-oriented boundaries (Jensen & Meckling, 1976). This creates an explicit conceptual tension: while Agency Theory supports SR primarily to reduce asymmetry and monitoring costs, Stakeholder Theory often demands disclosures that exceed minimal compliance, potentially generating cost pressures, operational burdens, and reputational exposure that are not fully explained by agency-based arguments alone.

This contradiction becomes more salient in ASEAN, where institutional enforcement varies widely and coercive regulatory pressure can be weak or uneven. To bridge this theoretical gap, Institutional Theory offers additional insight: when legal enforcement (coercive pressure) is limited, firms tend to rely more on normative (industry expectations) or mimetic (peer and market-leader imitation) pressures to guide sustainability disclosure practices (DiMaggio & Powell, 2010). In such contexts, governance mechanisms may not only “improve” SR in a technical sense but also shape whether SR becomes symbolic, selectively framed, or substantively embedded. This institutional limitation, weak coercive pressure combined with strong mimetic/normative cues, helps explain why ASEAN SR practices often appear fragmented and why cross-country comparability remains challenging (Abbas et al., 2022). As a result, this unresolved interplay between governance incentives and institutional pressures underscores the need for a systematic synthesis to understand SR in ASEAN.

Empirical findings reinforce that governance quality affects not only disclosure presence but also SR depth and credibility. For example, Goel and Vishnoi (2022) show that broader sustainability-related commitments can align with performance-related outcomes, while Lee et al. (2025) emphasize that governance diversity and board oversight enhance comparability and depth of reports. In addition, evidence in ASEAN confirms that independent directors and women on boards positively influence SR reliability and readability, strengthening perceived report quality in Malaysia and Indonesia (Chairina & Tjahjadi, 2023; Khunkaew et al., 2023). Importantly, these governance effects can be interpreted through the Resource-Based View: high-quality SR supported by GCG can be seen as the output of unique intangible resources such as sustainability reputation, board competencies, and digital capabilities for assurance that provide a competitive advantage because they are difficult to imitate and embedded in organizational routines (Barney, 1991). In other words, stronger governance helps firms transform SR from a symbolic narrative into a strategic asset that improves legitimacy and potentially firm value. This connection between conceptual tensions and empirical patterns highlights the importance of integrating both perspectives in reviewing SR outcomes.

At the same time, the adoption of hybrid frameworks (e.g., GRI, CDP, SASB) reflects governance-driven attempts to formalize ESG disclosure across markets (Emer et al., 2026). Yet voluntary compliance and uneven enforcement persist as persistent obstacles, underscoring that governance alone cannot fully resolve SR fragmentation without stronger institutional alignment (Abbas et al., 2022). Pratama et al. (2022) also highlight that sustainability disclosure standards can be applied unevenly, suggesting that governance improvements may outpace the maturity of environmental and social measurement systems. Collectively, the literature indicates that the governance SR relationship is robust, but it is theoretically incomplete unless

it explicitly accounts for stakeholder-driven disclosure expansion, institutional pressures, and intangible resources that enable credible assurance.

Sustainability-Oriented Innovation and Digital Transformation

Sustainability-oriented innovation (SOI) reflects a transformative shift in which technology and environmental responsibility converge, particularly in data-intensive, fast-innovating contexts such as ASEAN's technology sector (Harsanto & Permana, 2019). Technology firms increasingly deploy digital infrastructures such as AI-enabled analytics, blockchain, and cloud-based systems to automate sustainability reporting workflows, improve traceability, and enhance transparency (Qureshi et al., 2020). The relevance of Actor Network Theory (ANT) becomes clearer when SR is treated not only as disclosure but also as an assurance-relevant socio-technical process: ANT frames digital technologies as "actors" in reporting networks that shape what data become visible, how evidence is verified, and how risks of data hiding or greenwashing can be reduced through traceability and verifiability (Harsanto & Permana, 2019). In this sense, technologies (blockchain/AI) are not merely tools; they function as enabling actors that support SR assurance by strengthening audit trails, standardizing evidence flows, and constraining opportunistic reporting narratives, issues that are central to credibility in sustainability reporting systems.

The literature also indicates that digitalization strengthens the link between sustainability commitments and competitiveness. Guzmán et al. (2023) highlight that digital green governance frameworks can improve verification processes, while Sreenath et al. (2021) show how technology-enabled systems increase efficiency and support best practices within ASEAN contexts. Yu et al. (2024) further suggest that eco-innovation can mediate the relationships between ESG disclosure and corporate development, implying that sustainability innovation and digital transformation can reinforce one another. However, readiness for this transformation is uneven across ASEAN; some economies have advanced governance and digital infrastructures, while others face infrastructure gaps and human capital constraints that limit the scaling of digital SR systems.

The Technology Organization Environment (TOE) logic offers a useful lens for synthesizing evidence across studies. At the Technology level, constraints arise from infrastructure limitations and limited digital integration for traceability and analytics. At the Organization level, barriers involve capacity constraints, skill gaps, and weak readiness to embed SR into data systems and governance routines (Jan & Ismail, 2023). At the Environment level, voluntary regimes, inconsistent policies, and uneven enforcement reduce incentives for digital assurance investments. This encourages selective technology adoption (Jan & Ismail, 2023; Qureshi et al., 2020). The TOE-structured synthesis links adoption barriers to measurable institutional and capability conditions. It avoids treating digital transformation as uniform across ASEAN.

Crucially, the relationship between SR and innovation is not one-directional. The literature supports a two-way feedback loop: while innovation and digital transformation can improve SR efficiency and credibility, ambitious SR requirements can also encourage sustainable innovation by forcing firms to build better data architectures, adopt traceability technologies, and redesign processes for environmental monitoring and performance management (Qureshi et al., 2020). In this loop, SR becomes a catalyst that pushes firms toward eco-innovation and operational improvements, not merely a reporting endpoint. Thus, sustainability-oriented innovation and SR are mutually reinforcing in technology-intensive contexts, yet the strength of this loop remains contingent on organizational capacity and enabling institutional environments across ASEAN economies.

Institutional Pressures and Regional Disparities in ASEAN

Institutional theory provides a strong explanatory lens for understanding variations in sustainability reporting across ASEAN, especially where coercive regulation is uneven, and firms face mixed expectations from global standards and localized practices (DiMaggio & Powell, 2010; Lodhia et al., 2025). Coercive, normative, and mimetic pressures influence how companies internalize sustainability values, select reporting

frameworks, and develop disclosure routines (Abbas et al., 2022). Countries with stronger institutional frameworks, such as Singapore and Malaysia, tend to achieve higher reporting consistency partly due to governance reforms and transparency initiatives (Abbas et al., 2022; Chairina & Tjahjadi, 2023). By contrast, voluntary compliance remains more prevalent in several ASEAN states, where fragmented regulation contributes to inconsistent ESG disclosure quality and uneven stakeholder trust (Sambodo et al., 2022).

A critical implication of this hybrid landscape is the heightened risk of “cherry-picking,” where firms selectively disclose favorable indicators while omitting material negative impacts. When global frameworks (e.g., GRI/TCFD-like expectations) are adopted alongside localized adaptations without harmonized enforcement, comparability declines and ESG signals become harder to benchmark across countries and firms, an issue that matters especially for global ESG investors seeking consistent, decision-useful data (Lee et al., 2025; Tan & Dipendra, 2024). The result is a disclosure environment in which legitimacy-seeking narratives coexist with weak data comparability, increasing uncertainty in capital allocation, and potentially distorting ESG-related investment decisions. This is also consistent with the observation that ASEAN’s regional harmonization efforts still face gaps due to uneven enforcement and infrastructure limitations.

Assurance mechanisms, both internal and external, become pivotal under these institutional conditions. From an institutional lens, assurance strength is shaped by the same pressure types: strong coercive pressure tends to encourage more formal assurance practices, whereas weak coercive pressure coupled with strong mimetic/normative pressures can lead to symbolic assurance signals that satisfy visibility needs without ensuring robust verification. Good corporate governance can strengthen assurance by institutionalizing oversight, increasing board accountability, and improving internal controls around ESG data production and reporting (Abbas et al., 2022; Chairina & Tjahjadi, 2023). Conversely, in markets where legitimacy motivations dominate and verification infrastructure remains underdeveloped, assurance failures may increase exposure to ESG misstatement or fraud risk, especially when sustainability claims lack traceable evidence (Lu & Wang, 2021). This risk reinforces the conceptual need to synthesize how governance and institutional pressures jointly shape the credibility of SR systems across ASEAN technology-linked industries.

Overall, the institutional literature suggests that ASEAN sustainability reporting operates within a hybrid system: global disclosure expectations diffuse into local settings, but inconsistent enforcement and uneven capability create disparities in quality and assurance. This hybrid reality underpins the urgency for systematic synthesis, particularly to clarify how coercive, normative, and mimetic pressures interact with governance and digital readiness to influence SR credibility and comparability across ASEAN.

Method

This study adopts the Systematic Literature Review (SLR) approach following the PRISMA 2020 protocol to ensure transparency and reproducibility in the synthesis process. The search strategy focused on identifying empirical studies examining sustainability reporting (SR) in the context of technology and technology-intensive industries in ASEAN countries. Database searches were conducted in Scopus and Web of Science, the primary sources, due to their comprehensive coverage and high-quality peer-reviewed indexing. Google Scholar was used only as a supplementary source for backward and forward citation searches. To minimize potential bias, Google Scholar searches were limited to the top 100 most relevant results, and only peer-reviewed journal articles with a verifiable DOI were included after duplicate removal.

The inclusion criteria were defined operationally to strengthen transparency. Articles were retained if they (1) analyzed firms located in at least two ASEAN member states or provided explicit comparative evidence among ASEAN economies; (2) focused on companies belonging to the Information and Communication Technology (ICT) sector—defined as organizations engaged primarily in software development, telecommunications, IT services, and digital platforms—or technology-intensive sectors, which include advanced manufacturing (such as electronics and precision engineering), digital infrastructure (such as data

centers, cloud providers, and communications networks), or data-driven services (such as fintech and healthtech enterprises); and (3) adopted a formal sustainability reporting or ESG framework, including but not limited to GRI, SASB, or TCFD. Only English-language, peer-reviewed journal articles published within the 2015–2024 window were included. Studies were excluded if they were purely conceptual, lacked empirical data related to ASEAN, addressed non-technology industries, or used unverified definitions of SR.

To ensure analytical rigor, each included article underwent a quality assessment adapted from social-science appraisal frameworks (e.g., CASP and JBI). For quantitative studies, quality was evaluated based on data validity, model robustness, and variable operationalization. For qualitative studies, the assessment emphasized methodological transparency, data triangulation, and auditability. Each paper was rated on rigor (high, moderate, or low), and only high- to moderate-rigor studies were included in the final synthesis. This procedure minimized bias arising from uneven methodological robustness across studies.

The PRISMA flow diagram (Figure 1) summarizes the selection process. A total of 196 records were identified across all databases. After removing 23 duplicates and 41 non-academic or irrelevant records, 133 articles remained for title and abstract screening. Of these, 118 were excluded because they either fell outside the ASEAN context or did not analyze technology-related industries. The remaining 15 articles were retrieved for full-text evaluation, but 7 were excluded for lacking empirical data or using ambiguous definitions of “technology firms.” An additional 3 studies were identified through citation chasing, bringing the total to 11 final articles included in the review. The most common reasons for exclusion at the full-text stage were: (i) inappropriate sectoral classification ($n = 3$), (ii) non-ASEAN data scope ($n = 2$), and (iii) absence of formal SR/ESG framework ($n = 2$).

In summary, the final corpus represents the most methodologically rigorous and thematically relevant body of work addressing sustainability reporting in ASEAN technology and technology-intensive industries. All included studies were coded for metadata (country coverage, sector, theoretical framework, and method), thematically categorized, and synthesized according to governance, innovation/digital transformation, and institutional pressure dimensions.

Result and Discussion

Following the PRISMA 2020 protocol, a total of 196 records were initially identified across databases (primarily Scopus) using the keywords “sustainability reporting ASEAN,” “ESG technology company,” “digital maturity,” and “sustainability disclosure.” After removing duplicates (n = 23), ineligible sources (n = 11), and non-tiered or irrelevant publications (n = 29), 133 articles were screened based on titles and abstracts.

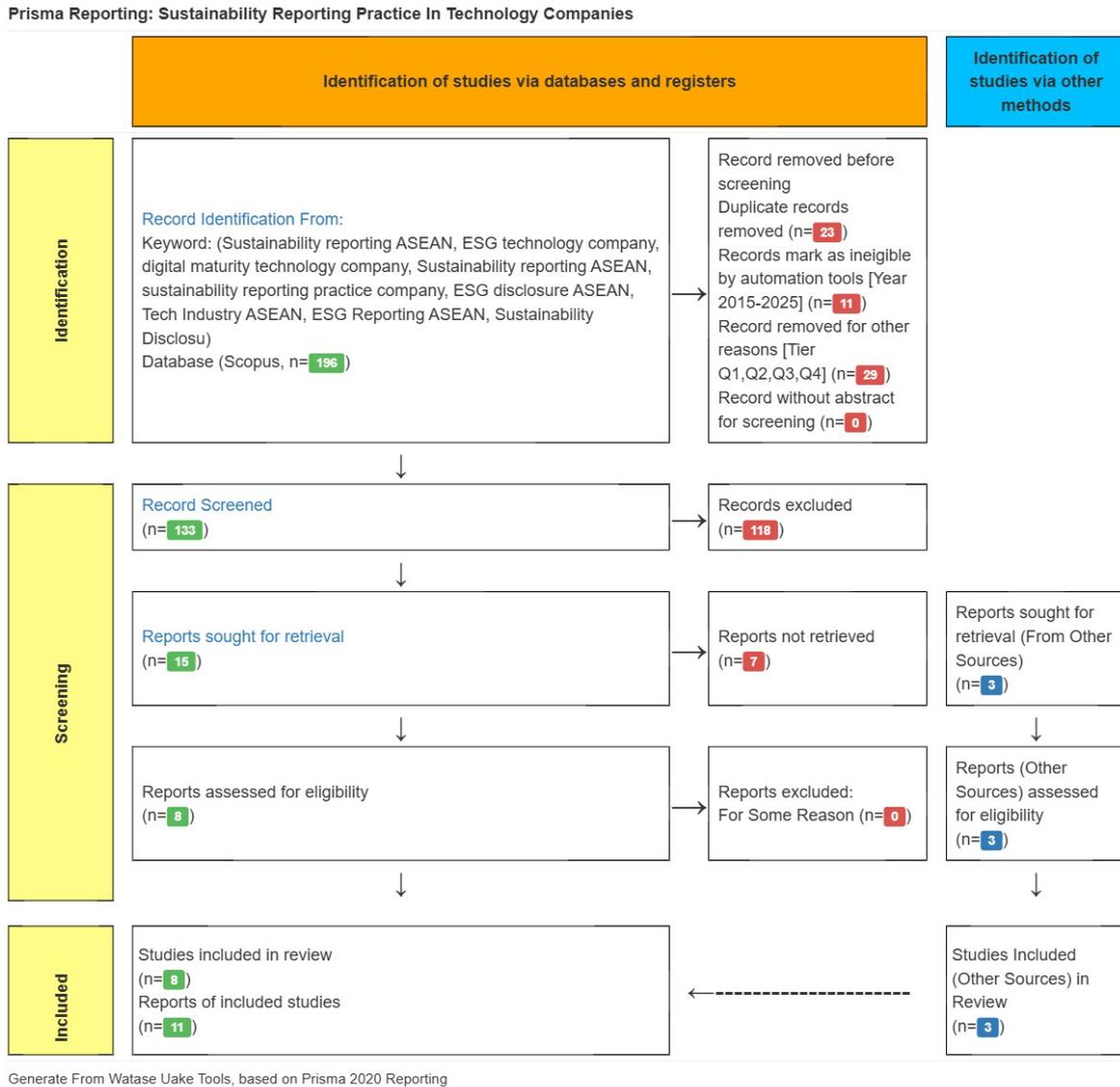


Figure 1. Flow of Article selection (n = 11)
Source: Processed data

From these, 15 full-text articles were sought, of which 8 were assessed for eligibility; an additional 3 studies were retrieved from other sources, yielding 11 articles included in the final review. This process is illustrated in Figure 1 (PRISMA Flowchart). The selection ensured regional relevance, theoretical contribution, and methodological rigor, particularly for studies addressing ASEAN’s sustainability disclosure and technology-linked industries.

Table 1. List of Articles

No	Author(s) & Year	Country / Region	Focus / Objective	Main Findings
1	Chairina and Tjahjadi (2023)	ASEAN	Corporate governance to SR quality	Governance/board oversight is linked to higher SR quality, including credibility and readability, often framed as reputation/performance signaling.
2	Jouha (2015)	ASEAN	Governance and SR	Governance mechanisms, tied to monitoring/accountability, support SR quality and connect disclosure to market/financial outcomes.
3	Khunkaew et al. (2023)	ASEAN	GCG–SR relationship	Frequently cited evidence that governance attributes (board/oversight) shape SR credibility/quality in ASEAN settings.
4	Abbas et al., (2022)	ASEAN	Institutional fragmentation and SR	Used to argue that SR in ASEAN is shaped by fragmented institutions, often legitimacy-driven, reducing comparability and enabling selective disclosure/greenwashing risk.
5	Lu and Wang (2021)	Global	“Assurance layer” / traceability / greenwashing risk	Used to emphasize that traceability, auditability, and verification are understudied; weak comparability + legitimacy incentives increase greenwashing risk and complicate assurance.
6	Jan and Ismail (2023)	Global	Digital transformation as a SR mechanism	Cited to show that fewer studies integrate digital transformation as a co-determining mechanism shaping what is measurable, verifiable, and disclosed.
7	Yu et al. (2024)	ASEAN	Digital capability → SR quality	Used to argue that digital capability translates governance intent into reporting quality through data availability, standardization, and process integration.
8	R. K. Goel and Vishnoi (2022)	Global	SR and outward outcomes	Used to support the point that studies often measure externally signaled outcomes (performance proxies/reputation) more than assurance-related outcomes.
9	Qureshi et al. (2020)	Manufacturing / sustainable manufacturing context	Sustainable practices and disclosure (non-ICT setting)	Cited to acknowledge sectoral mismatch: evidence from manufacturing may not fully generalize to ICT; retained to support capability/process transparency arguments.
10	Lee et al. (2025)	ASEAN	SR comparability/credibility under institutional conditions	Used to reinforce the comparability problem, legitimacy pressures, and implications for SR credibility and ESG assurance challenges.

No	Author(s) & Year	Country / Region	Focus / Objective	Main Findings
11	Harsanto and Permana (2019)	ASEAN	ANT / socio-technical networks and SR credibility	Used to justify ANT: SR credibility is co-produced by socio-technical networks, including technologies and reporting infrastructures as “actors” in verification/evidence flows.

After systematic screening according to the PRISMA 2020 protocol, 11 studies were included in the final review (see [Figure 1](#)). These studies collectively represent the empirical and theoretical foundation for understanding sustainability reporting (SR) practices in ASEAN technology and related industries. The selected articles reflect growing academic attention between 2015 and 2024, focusing on SR’s linkages to governance, innovation, performance, and institutional contexts.

Overall, the literature demonstrates that corporate governance quality, digital readiness, and institutional maturity are the three strongest drivers of sustainability reporting advancement in ASEAN. Most empirical studies emphasize Malaysia, Indonesia, Thailand, and Singapore as the leading contributors to SR research and implementation, while theoretical papers offer broader frameworks to interpret regional disparities. Key findings highlight that firms with strong board structures, sustainability committees, and gender diversity tend to produce higher-quality sustainability reports. Furthermore, technological innovation and institutional policy coherence strengthen the link between ESG disclosure and corporate performance.

The reviewed studies converge on the argument that sustainability reporting in ASEAN is progressing but unevenly. Empirical evidence supports that SR improves reputation, performance, and stakeholder legitimacy, while theoretical contributions emphasize governance, innovation, and institutional frameworks as enablers of SR adoption. Countries such as Malaysia and Singapore lead in regulatory adoption and digital disclosure, whereas Indonesia, Thailand, and the Philippines demonstrate steady, though voluntary, SR evolution.

These findings reaffirm the relevance of stakeholder, legitimacy, and resource-based perspectives in explaining how technology firms internalize sustainability reporting. The interplay between governance quality and innovation capacity reflects a hybrid theoretical mechanism: legitimacy pressure drives disclosure expansion, while resource-based capability determines disclosure quality. This synthesis aligns with the institutional logics approach, indicating that SR practices in ASEAN’s technology sectors are not merely symbolic but gradually embedded as strategic routines.

Mapping the Existing Body of Knowledge

This review maps 11 studies into three pillars: corporate governance, sustainability-oriented innovation/digital transformation, and institutional pressures. Yet, the mapping becomes more informative when treated as a quantitative-critical synthesis rather than a descriptive classification. Across the governance pillar, the most frequently examined GCG attributes are those linked to monitoring and accountability, particularly board-related characteristics such as independence and oversight structures that influence disclosure credibility and readability ([Chairina & Tjahjadi, 2023](#); [Jouha, 2015](#); [Khunkaew et al., 2023](#)). In contrast, governance mechanisms that are more operational and assurance-oriented, such as data governance routines, internal control readiness for ESG data, and board-level assurance competencies, appear less consistently articulated, even though they are central for preventing selective disclosure and greenwashing risks ([Abbas et al., 2022](#); [Lu & Wang, 2021](#)). This imbalance indicates that SR research in ASEAN has been relatively stronger in testing “who governs” (structural governance attributes) than “how governance operationalizes assurance” (process capability), which is the crucial bridge to credible reporting.

From a theoretical lens, the dominant interpretive frames across the 11 studies remain focused on legitimacy- and stakeholder-oriented explanations of disclosure behavior, in which SR primarily serves as a tool for reputation management and external validation (Abbas et al., 2022; Chairina & Tjahjadi, 2023; Khunkaew et al., 2023). Governance SR links are commonly interpreted through accountability and credibility narratives, but fewer studies integrate digital transformation as a co-determining mechanism that reshapes what can be measured, verified, and disclosed (Jan & Ismail, 2023). As a result, the literature tends to treat governance and innovation as parallel drivers rather than as interacting mechanisms within a socio-technical reporting system. This theoretical fragmentation is important because ASEAN's institutional environment is uneven: where coercive enforcement is weak, firms are more likely to follow normative or mimetic pressures, making symbolic compliance attractive and limiting incentives for investment in assurance-grade ESG data systems (Abbas et al., 2022; Yu et al., 2024).

The pattern is also evident in the types of outcomes most frequently measured. Most studies emphasize externally signaled outcomes, such as firm performance proxies, reputational benefits, and disclosure quality metrics, rather than outcomes linked to verification strength and decision usefulness (Chairina & Tjahjadi, 2023; R. K. Goel & Vishnoi, 2022; Khunkaew et al., 2023). This reveals what is frequently overlooked: the "assurance layer" of sustainability reporting, and how internal/external verification, data traceability, and auditability influence the credibility of SR and the integrity of ESG-related decision-making (Lu & Wang, 2021). In other words, while SR is repeatedly associated with improved legitimacy and performance narratives, fewer studies directly test whether ASEAN firms are building the governance-and-technology infrastructure required for robust assurance and comparability across markets.

A further conceptual issue concerns sectoral alignment. Although the review focuses on technology companies and technology-intensive industries, several cited findings originate from contexts such as manufacturing or broader sustainability practice settings (e.g., sustainable manufacturing practices), which may not be directly generalizable to ICT firms without qualification (Qureshi et al., 2020). The theoretical rationale for retaining these studies is that technology-intensive industries share critical features with ICT-driven data operations, innovation dependence, and reliance on process transparency, making them useful for explaining capability-based transitions toward credible sustainability reporting. However, this alignment should be carefully acknowledged: when empirical settings are dominated by manufacturing or energy-related operations, the mechanisms of SR adoption may be influenced by sector-specific regulatory pressures and environmental externalities that differ from those in ICT contexts. Accordingly, this SLR identifies a literature limitation: sectoral heterogeneity reduces the precision of inference for "pure ICT" and calls for more technology-sector-specific studies to validate whether the same governance innovation mechanisms operate with comparable strength in ASEAN's digital industries (Abbas et al., 2022; Qureshi et al., 2020).

Overall, this mapping suggests that SR research in ASEAN is still largely situated in a legitimacy-seeking disclosure phase, where reporting functions primarily as a signal for external approval and reputational positioning, and has not yet fully progressed into a value-creation disclosure phase where governance and digital capabilities jointly enable assurance-grade ESG information to support strategic decision making and allocative efficiency (Chairina & Tjahjadi, 2023; Khunkaew et al., 2023; Lu & Wang, 2021).

The mapping shows that SR scholarship in ASEAN's technology sector now forms a structured, multi-dimensional field rooted in governance, innovation, and institutional reform. The results are structured, but more cross-country and time-trend insights (2015-2025) are needed to show variations in policy diffusion, digital readiness, and institutional maturity across ASEAN. Comparative and time-series approaches would enrich understanding of how SR shifts from compliance-oriented to performance- and innovation-based practices. As a result, the ASEAN SR landscape appears to be consolidating into a more unified yet contextually adaptive ecosystem. Here, technological progress and governance modernization reinforce each other.

Theoretical Underpinnings Linking Sustainability Reporting (SR) with Governance, Innovation, and Performance

The theories linking sustainability reporting (SR), governance, innovation, and performance in ASEAN technology sectors are best understood as layered, not single-theory, explanations. Agency Theory views SR as a monitoring and disclosure tool to reduce information gaps and limit managerial opportunism. This suggests that stronger governance should improve SR quality and market outcomes (Jensen & Meckling, 1976; Jouha, 2015). Stakeholder and legitimacy perspectives add that SR is a strategic response to external expectations. Credibility and visibility are critical for maintaining social approval, investor trust, and reputation (Chairina & Tjahjadi, 2023; Freeman, 1984; Khunkaew et al., 2023). In ASEAN, empirical evidence supports these ideas: Board-related governance is linked with better SR quality, readability, and credibility, interpreted as signals that enhance reputation and performance (Chairina & Tjahjadi, 2023; R. K. Goel & Vishnoi, 2022; Khunkaew et al., 2023; Lee et al., 2025).

However, an agency-centered explanation becomes incomplete in ASEAN's institutional environment, where coercive pressure and law enforcement are often uneven across countries and industries. Under Institutional Theory, when coercive mechanisms are weak, firms rely more heavily on normative and mimetic pressures, industry norms, professional expectations, and imitation of market leaders to shape disclosure practices (Abbas et al., 2022; DiMaggio & Powell, 2010). This is precisely the context in which Actor Network Theory (ANT) and the Triple Helix Model become theoretically relevant not as substitutes for Agency Theory, but as complementary lenses that explain how governance can "work" when formal enforcement is insufficient. ANT emphasizes that SR credibility does not emerge solely from managerial incentives or board monitoring; it is co-produced by networks of actors, including digital technologies and reporting infrastructures that shape what data are collected, how they are validated, and how they circulate as credible evidence (Harsanto & Permana, 2019; Qureshi et al., 2020). In weak coercive environments, governance is often forced to operationalize SR improvement through socio-technical arrangements such as data systems, traceability tools, and analytics-enabled reporting routines that can strengthen verification even when external enforcement is limited (Qureshi et al., 2020). In parallel, the Triple Helix Model helps explain how SR and innovation capacity are advanced through normative collaboration across universities, industry, and government, particularly in emerging ASEAN economies where capability building is network-dependent and policy diffusion is uneven. In this sense, governance supports SR not only by monitoring disclosure but also by enabling the institutional and technological networks through which SR becomes measurable, comparable, and increasingly auditable.

This complementarity also clarifies why innovation and digital transformation are repeatedly positioned as SR enablers in ASEAN. Digital capability can translate governance intent into reporting quality by improving data availability, standardization, and process integration, thereby strengthening the pathway from SR adoption to performance-relevant outcomes (Yu et al., 2024). Yet, the evidence base also suggests that ASEAN SR systems remain uneven in comparability and often legitimacy-oriented rather than assurance-oriented (Abbas et al., 2022; Lee et al., 2025). Theoretically, this combination of low data comparability and strong legitimacy incentives elevates the risk of greenwashing because firms can selectively disclose favorable indicators while minimizing material negatives, especially in voluntary or fragmented regimes where cross-firm benchmarking is difficult (Abbas et al., 2022; Lu & Wang, 2021). When SR is driven predominantly by legitimacy-seeking disclosure, the reporting function may converge toward symbolic compliance, where narratives and selectively curated metrics substitute for verifiable, decision-useful ESG information. This condition has direct implications for ESG assurance providers in ASEAN: weak comparability constraints, limited assurance planning and benchmarking, fragmented standards that complicate materiality judgments, and limited traceability that increases verification costs. Consequently, assurance risks are heightened, not only in detecting misstatement but also in ensuring that SR claims are supported by auditable evidence and consistent measurement rules across markets (Lee et al., 2025; Lu & Wang, 2021).

Overall, the theoretical linkage across governance, innovation, and performance in ASEAN SR can be summarized as follows: Agency Theory explains why governance should demand SR to mitigate informational risk; stakeholder and legitimacy lenses explain why firms disclose to secure external support; institutional theory explains why weak enforcement shifts the locus of influence toward normative and mimetic pressures; and ANT and Triple Helix clarify how governance leverages networks, collaboration, and digital infrastructures to produce credible SR in such environments (DiMaggio & Powell, 2010; Freeman, 1984; Jensen & Meckling, 1976). This integrated foundation supports the manuscript's central synthesis: in ASEAN's technology-linked sectors, SR quality and performance relevance increasingly depend on the governance innovation nexus, where governance legitimacy and monitoring must be translated into assurance-grade reporting through digital capabilities and network-based institutional arrangements.

Emerging Challenges and Future Research Directions

Sustainability reporting (SR) in ASEAN technology and technology-intensive industries continues to evolve within a complex landscape shaped by institutional fragmentation, uneven digital readiness, and persistent credibility concerns. A primary challenge remains the hybrid and uneven institutional environment across ASEAN, where sustainability disclosure is frequently driven by voluntary initiatives and heterogeneous regulatory maturity rather than harmonized coercive enforcement (Abbas et al., 2022). This fragmentation weakens cross-country comparability and encourages selective disclosure, particularly when legitimacy-seeking narratives dominate reporting incentives (Lee et al., 2025; Lu & Wang, 2021). In practice, heterogeneous adoption of reporting frameworks and the absence of regionally aligned materiality guidance can increase the risk of greenwashing and complicate the work of assurance providers who require traceable, consistent, and verifiable ESG evidence (Abbas et al., 2022; Lu & Wang, 2021). These challenges are amplified in technology contexts, where data intensity creates both opportunity (richer measurement potential) and risk (a greater scope for selective reporting if governance and verification routines are weak) (Qureshi et al., 2020).

Building on these substantive challenges, the reviewed literature also reveals clear directions for a future research agenda. First, the evidence base remains heavily concentrated in cross-sectional and regression-oriented designs, which limits causal inference about whether stronger SR quality drives economic outcomes or merely correlates with better-performing firms. Future research should therefore adopt longitudinal designs that track SR quality changes over time and test causality in key capital-market outcomes that matter to ASEAN technology firms, particularly the pathways through which SR credibility may influence financing conditions and investor responses (Chairina & Tjahjadi, 2023; R. K. Goel & Vishnoi, 2022; Khunkaew et al., 2023). A longitudinal approach would also allow researchers to observe how shifts in governance structures, digital capability, and institutional reforms jointly shape SR maturity across ASEAN contexts (Abbas et al., 2022). Second, future research should deepen mechanism-based explanations by explicitly modeling the interaction between governance oversight and digital transformation capability rather than treating them as independent predictors because the synthesis indicates that SR quality in ASEAN increasingly depends on the governance innovation nexus (Lee et al., 2025). Third, more cross-country comparative work is needed to explain why similar disclosure frameworks yield different credibility outcomes across ASEAN markets, especially under varying institutional pressures and enforcement levels (Abbas et al., 2022).

Technological recommendations also require more operational clarity to support SR credibility and assurance. Rather than treating AI, blockchain, and big data analytics as generic "enablers," future research and practice can specify how each technology strengthens SR systems. AI can be used to conduct structured textual analysis of sustainability reports, such as sentiment and tone assessments of peer disclosures, to detect mimetic pressure dynamics and competitive imitation within technology sectors, while also supporting anomaly detection in sustainability narratives when claims appear inconsistent with performance indicators (Abbas et al., 2022). Big data analytics can integrate operational, supply-chain, and environmental monitoring data into centralized ESG data architectures, improving completeness and timeliness of reporting, and enabling governance bodies to monitor sustainability performance beyond annual reporting

cycles (Qureshi et al., 2020). Blockchain, in turn, has a distinct assurance-relevant function: it can strengthen auditability and traceability of granular emissions or resource-use data by creating immutable records that reduce data hiding risks and improve evidence reliability for assurance providers, which is especially vital in fragmented and legitimacy-driven disclosure environments (Lu & Wang, 2021; Qureshi et al., 2020). Taken together, these technologies provide a pathway to shift ASEAN SR from narrative-heavy legitimacy signals toward assurance-grade, verifiable disclosure supported by robust data trails.

Finally, collaboration mechanisms should be specified more concretely to address ASEAN-wide comparability and assurance gaps. In this regard, the proposed ASEAN Sustainability Reporting Consortium can be positioned as a practical institutional vehicle aligned with the Triple Helix logic of university-industry-government collaboration. At a minimum, the Consortium can perform two core functions. First, it can develop a regional double materiality guidance tailored to technology and technology-intensive industries, clarifying both how sustainability issues affect firm value and how firms impact society and the environment, thereby improving consistency of disclosure scope across countries and reducing cherry-picking incentives (Abbas et al., 2022; Lee et al., 2025). Second, it can establish a sector-specific benchmarking database of ESG and SR performance metrics for ASEAN technology firms, enabling comparability, peer learning, and stronger normative pressure for credible reporting. Such a database would also support assurance providers by creating reference baselines for evaluating disclosure plausibility and performance consistency across firms (Lee et al., 2025; Lu & Wang, 2021). Over time, these collaborative functions can strengthen the institutional infrastructure necessary for ASEAN SR to progress from a fragmented, legitimacy-seeking phase toward a more value-creating and assurance-ready disclosure ecosystem.

Conclusions and Recommendations

This systematic literature review highlights that sustainability reporting (SR) in technology companies within the ASEAN region remains an evolving yet uneven practice. The review reveals steady growth in SR adoption. However, external legitimacy and regulatory pressures drive it more than internalized sustainability values. Governance mechanisms, like board independence and gender diversity, play a key role in improving report quality and stakeholder trust. Yet, the absence of unified regional standards and the dominance of voluntary disclosure limit comparability and accountability across countries.

Innovation and digitalization are essential drivers for improving the efficiency and transparency of SR. However, the transfer of sustainable technologies and digital reporting tools faces constraints. These challenges arise from institutional fragmentation and resource limitations. Firms often approach SR as a reputational tool. They rarely see it as a strategic management system integrated with long-term environmental and social objectives.

In conclusion, advancing sustainability reporting in ASEAN's technology sector requires regulatory harmonization. There should be integration of digital innovation into reporting systems. A stronger alignment between corporate governance and sustainability performance is also necessary. Future studies should adopt longitudinal, interdisciplinary approaches. These will better capture the dynamic relationships among sustainability reporting, innovation, and governance in a digital, competitive regional context.

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